TROPIC MOVEMENTS IN PLANTS

Tropic movement is the movement of the plant in response to stimulus present in the surroundings. Tropic movements can be either toward the stimulus or away from it. The important tropic movements are listed below-

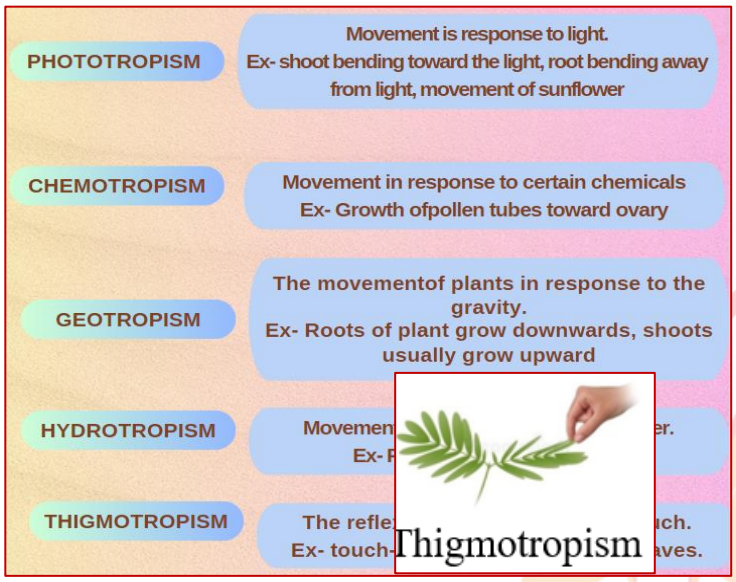
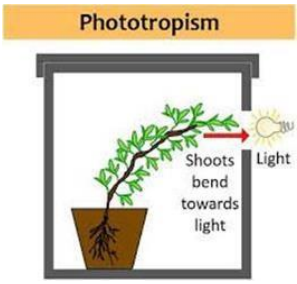
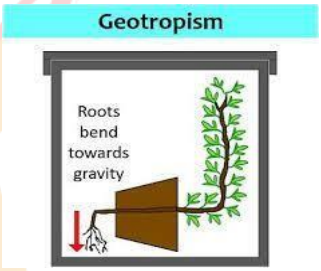


Fig 11.4: hydrotropism





INTRODUCTION OF PLANT HORMONES

Growth and differentiation in plants depend on a few hormones calls as plant growth regulators/ plant growth hormones/ Phytohormones. These are organic substances that are synthesized in minute quantities in one part of the plant body and transported to another part where they show specificphysiological processes.

Phytohormones	Growth promoter/ growth inhibitor	Explanation
Auxin	Growth promoter	Stem elongation
Gibberellins		Growth of stem
Cytokinin		Cell division
Ethylene	Growth inhibitor	Wilting of leaves
Abscisic acid		Fruit ripening

CONTROL AND CO-ORDINATION IN ANIMALS

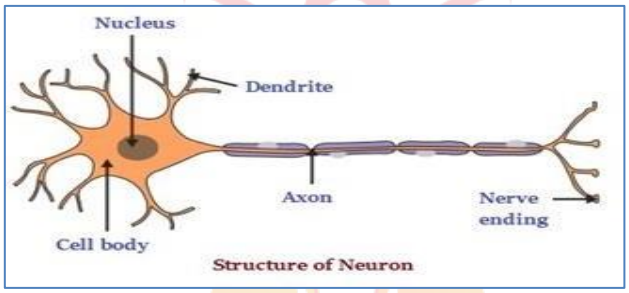
In animals control and coordination is carried out with the help of -

- Nervous system
- Muscular tissue
- Endocrine system: Hormones
- Nervous system

Nervous System	
CNS (Central nervous system)	PNS (Peripheral Nervous System)
Brain + Spinal cord	all the nerves associated with the CNS

NEURONS

Neurons are composed of cell body, dendrite, axon and nerve ending.

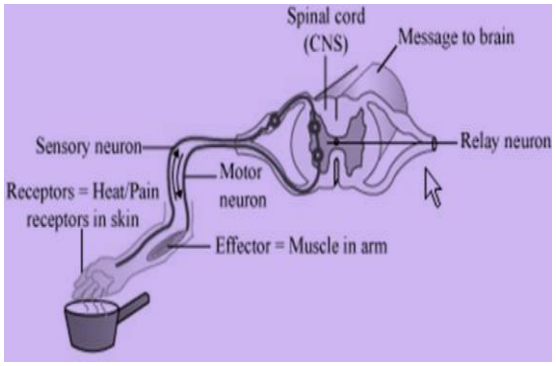


HOW NERVOUS IMPULSE TRAVELS IN BODY

- Dendritic tips receive stimulus and an electrical impulse is generated in neurons.
- This impulse travels from the dendrite to the cell body and then along the axon to its end.
- At the axon ending some chemicals are released that cross the synapse and start a similarelectrical impulse in next neuron.

REFLEX ACTION

- Reflex action is a sudden and involuntary response to any stimuli.
- It originates in the spinal cord.
- Ex- Drawing hand away from the hot plate, watering of mouth in response to food etc.



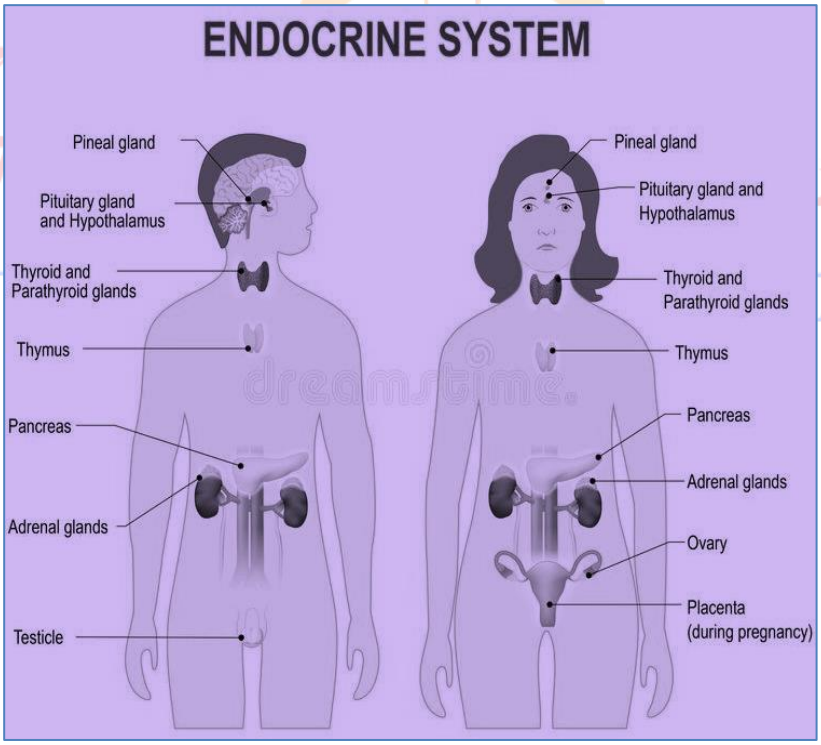
- The neural pathway that controls thereflex action is called as a reflex arch
- In these sensory neurons, spinalcord, relay neuron, motor neuron and effector muscles are involved.

- Stimulus is received by sensory neurons. The sensory neurons transfer sensory impulses to the spinal cord (CNS). Spinal cord process the stimulus. The motor nerve fiber relays the motor impulses from the nervous system to the effector organs like muscles.

HORMONES IN ANIMALS-

Hormones are chemical messengers which are secreted by the ductless endocrine gland intothe blood. Hormones control the activity of certain cells and organs. Hormones can be peptides and steroid hormones. Some of the main endocrine glands are the pituitary gland, adrenal gland, thyroid gland, pancreas, testes, ovary etc.

Endocrine gland	Hormone	Role
PITUITARY GLAND	Growth hormone	Regulate growth and development
ADRENAL GLAND	Adrenaline	Stress hormones (enable the body ready to dealwith the stressed condition), Increase heartbeat, Increase breathing rate
THYROID GLAND	Thyroxine	Regulate carbohydrate, protein and fat metabolism
PANCREAS	Insulin	Regulate blood sugar level
TESTES	Testosterone	Changes associated with puberty in male
OVARY	Oestrogen	Changes associated with puberty in female



- **GOITER**- Iodine is necessary for the formation of thyroxin hormone. If Iodine is in low concentration the thyroid gland swells and causes goiter.

- **GIGANTISM and DWARFISM**- Excess secretion of growth hormone from the pituitary gland causes excess growth of the body (gigantism) and less secretion results in dwarfism.

IMPORTANT QUESTIONS

Very Short Answer Type Questions-

1- Find out the plant growth inhibitor phytohormone

a- Auxin b- 2,4 D c- Cytokinin d- Abscisic acid

Ans: d

2- A deficiency of Iodine may result in the-

a- Goiter
b- Scurvey
c- Beri Beri
d- All of these

3- Testosterone comes under which of the following-

a- Estrogen
b- Progesterone
c- Androgen
d- Both a and c

Ans: c

4- Pancreas is responsible for the secretion of

a- Pancreatic juice
b- Pancreatic amylase
c- Insulin
d- All of these

Ans: d

5- Apical dominance and bolting in plants are due to-

a- Auxin and gibberellin
b- Auxin and cytokinin
c- Auxin and ethylene
d- Auxin and ABA

Ans: a

6- Name the hormone which helps in the regulation of glucose in the blood.

Ans: Insulin

7- Name two tissues that provide control and coordination in multicellular animals.

Ans: Nervous tissue and Endocrine tissue

Short Answer Type Questions-

8- Describe how the cells on the dark side of the shoot grow longer as the concentration of Auxin increases.

Ans: Auxin is a hormone that is found in plants and plays a key role in the growth and development of shoots and roots. Specifically, auxin helps regulate cell elongation, which is the process of cells growing longer as they move away from a source of light. Auxin increases the concentration of molecules in cells on the side of the shoot that is away from the light, which causes the cells to elongate. The increased concentration of auxin molecules signals the cells to grow longer, resulting in the shoot bending toward the light. This process is known as phototropism and is essential for plants to grow in the direction of light. Without auxin, plants would not be able to orient themselves properly and would not be able to survive.

9- Describe the structure of neurons.

Ans: A neuron is the basic unit of the nervous system. At the core of a neuron is the cell body, which houses the nucleus, the control center of the cell. Extending from the cell body are long, thread-like projections called dendrites, which receive signals from other neurons. The axon is a long, thin projection that transmits signals away from the cell body to other neurons or to effector organs. At the end of the axon are the synaptic terminals, which form connections with other neurons.

10- When our body receives a sudden stimulus, our body shows a strong reaction. Explain the process.

Reflex action is a type of involuntary, rapid and automatic response to stimuli. It is a basic physiological process that all animals possess and is characterized by its speed and lack of conscious thought. The reflex action mechanism involves the coordination of the sensory and motor systems and is based on the concept of stimulus and response. When the body receives strong and sudden stimuli like pressure, temperature or chemicals, then the sensory neuron sends a message to the spinal cord. The relay neuron sends the signal to the motor neuron and the latter sends a signal to the effectormuscle to respond.

11- **Compare chemotropism and Hydrotropism**.

Ans: chemotropism: Movement due to chemicals. E.g.- pollen tube growth on stigma and style. Hydrotropism: Movement due to water. E.g. growth of root toward water

Long Answer Type Questions

12- What are endocrine glands? Locate any four endocrine glands of humans by drawing suitable diagram.

Ans: endocrine glands are ductless glands that secrete hormones to control and coordinate bodyfunction.

Fig 7.7, page124, NCERT

13- (a) A person is advised by a doctor to take less sugar in his diet. Name the diseasefrom which the man is suffering. For the disease which hormone is responsible?

Name the endocrine gland which secretes growth hormone.

Which glands secrets growth hormone? What will be the consequences of Deficiency and Excess secretion of growth hormone?

ANS: (a)Disease- Diabetes mellitus, Hormone – Insulin, Gland- Pancreas

Gland- Pancreas

Gland- Pituitary Gland, Excess secretion: Gigantism, Deficiency: Dwarfism

14- How does chemical coordination occur in plants?

Ans: In plants, chemical coordination occurs with the help of plant hormones/ Plant growthregulators. (Phytohormones). Examples- Auxin, Cytokinin, Gibberellin, Abscisic acid, and ethylene. These hormones help to coordinate growth, development, and responses to the environment.Plant hormones are synthesized at different and diffuse to the area where they act.

Auxin promotes cell growth, Gibberellins promote stem elongation, Cytokinin promotes cell division, and Abscisic acid inhibits growth.

15- What events take place between the synapse of two neurons?

Ans. A synapse is a gap between two neurons. In between synapses, nerve impulses are conducted by a chemical process with the help of neurotransmitters (acetylcholine). within the axon, a nerve impulsetravels by an electric signal. When it reached to synapse, the neurotransmitters are released in the synaptic cleft. These neurotransmitters act as stimuli for the next neuron.